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## REVIEWS

**Stone's Flora of Southern New Jersey\***

Most botanists who see the work here described will doubtless be surprised to find that one of the best local floras ever published has been written by a man who is primarily an ornithologist, and issued by an institution which has not previously figured as a producer of botanical literature. As the book lacks a table of contents, a synopsis is subjoined which will probably give the reader a clearer idea of its scope than would the same number of words arranged in sentences.

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\* The plants of southern New Jersey, with especial reference to the flora of the pine barrens and the geographic distribution of the species. By Witmer Stone. Curator, Academy of Natural Sciences, Philadelphia. Ann. Rep. N. J. State Mus. 1910: 21-828. pl. 1-120. Map. 1911. Ja 1912.

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Perhaps the most noteworthy feature of the work, next to the profusion of original observations, is the emphasis laid throughout on natural geographical divisions based on soil and vegetation. The author here discards, though apparently not without some reluctance, the parallel transcontinental "life-zones" of his fellow zoölogists, and will perhaps be regarded by some of them as a heretic for daring to mention such a sharply defined and non-climatic geographical province as the coastal plain (whose significance was scarcely recognized by botanists up to about fifteen years ago, or by Stone himself until much more recently). As a partial justification of this seeming heresy he explains (pp. 42, 43) that perhaps the fall-line (the inland boundary of the coastal plain) has more effect on plants than it has on animals. (See also page 102.)

On page 42 the author expresses the opinion that because in the southern states "a great many coastal plain plants range far west of the fall-line," that line "is less potent southward." This conclusion is not well founded, though, for in Georgia for example there are scores if not hundreds of species of plants confined to the coastal plain which do not reach New Jersey at all; and the change in vegetation at the fall-line is just as notice-

able in the Carolinas and Georgia as it is in New Jersey, and perhaps more so than in Maryland and Virginia.

The area covered by the catalogue of plants is not quite coextensive with the coastal plain of New Jersey, but terminates at a county boundary about ten miles southeast of the fall-line (p. 40); an expedient justified by the fact that herbarium specimens collected in the counties through which the fall-line passes are in many cases not labeled with sufficient accuracy to indicate on which side of that important line they grew,\* and the narrow strip of coastal plain thus excluded is probably too small to contain any characteristic species that are not represented in the rest of the area.

By directing attention primarily to the vegetation the author has divided his territory into five pretty well marked regions, instead of the two divisions of the geologists, or only one as the zoölogists would have it. The colored map at the beginning of the volume shows the boundaries of the pine-barrens and the salt marshes very clearly, but combines the other divisions of the coastal plain in one color (and errs in including the whole of Staten Island in the coastal plain).

The summary of the field work of the author and his associates, in the preface, is accompanied by a small map showing their routes of exploration, which illustrates a commendable tendency to study plants *along routes*, instead of *at localities* in the old-fashioned or traditional manner of systematists.

The statistical lists of plants in various parts of the introduction are of a type familiar in some of the more pretentious local floras, and as they are not summarized the longer ones make rather dry reading. In other words, the opportunity to make some interesting generalizations about the times of flowering, modes of dissemination, percentage of monocotyledons, families and genera most numerous represented or conspicuous by their absence, etc., in each list was not taken advantage of. But that is so rarely done, and there are so many other things of interest and value in the book, that it would be unfair to criticize such omissions, and this remark is inserted merely as a suggestion for the future.

\* In this connection see Bull. Torrey Club 31: 10. 1904.

No attempt is made to describe the vegetation of the whole area systematically (for sufficient reasons, which the author explains on pages 33, 70 and 71); but under three of the geographical divisions, namely, the pine-barrens, the middle district, and the strand, quite a number of the characteristic or more abundant or conspicuous species are classified by habitat; which perhaps had never been done before for the middle district and pine-barrens. The relative abundance of the plants in these lists is not indicated, and some of them are not arranged in any apparent order; but habitat lists are still somewhat of a novelty (probably 90 per cent. of these published in America up to the present time are less than 15 years old), and there are very few local floras as yet which treat them any more scientifically than this one does.

Nearly as much space is devoted to the pine-barrens as to the other four regions combined, for that is the most unique and at the same time the least disturbed by civilization. The author here points out (pp. 57-58, 72-75) how the boundaries of this region have been misinterpreted by previous writers. Some have treated the whole coastal plain as pine-barrens, while others—mainly geologists—have regarded the region in question as coinciding with the area underlaid by Tertiary formations. A few had already noticed that the southern and western portions of the Tertiary region of New Jersey are not to be classed as pine-barrens, but it seems to have remained for Professor Stone himself to make known (about five years ago\*) the fact that between the pine-barrens and the coast, and extending some distance into the pine-barrens along the larger streams, is a strip of vegetation very similar to that of the middle district. This narrow belt of quasi-climax vegetation is not explained, but it probably owes its existence very largely to the protection from fire on one or both sides afforded by the waterways.†

On pages 73, 215, 402, 454, 485, and 802 one finds an idea that seems to be entirely new, namely, that on the larger streams the

\* *Proc. Phila. Acad.* 59: 452-459. 1907.

† See *Bull. Torrey Club* 38: 515-525. 1911.

dams nearest the coast now seem to mark the dividing line between the pine-barren vegetation and that of the coast strip, especially in the case of water-loving plants. This accords very well with the belief recently expressed by the reviewer\* that *pioneer* aquatic vegetation is commonly associated with *minimum* seasonal fluctuations of water, and *vice versa*; for seasonal fluctuations are of course least just above a dam or shoal or waterfall and greatest just below, and these dams have probably been in existence long enough for the vegetation to adjust itself pretty well to such conditions.

The vegetation of the pine-barrens, both upland and lowland, is distinctly of a pioneer type, with *Pinus rigida* the dominant tree. Among the less obvious floristic characters which distinguish it from that of the neighboring regions are abundance of monocotyledons, *Chamaecyparis*, *Rhynchospora*, *Gyrotheca*, *Lophiola*, *Utricularia* (p. 689), Melanthaceae, Orchidaceae (361) and Ericaceae (617), and scarcity or absence of *Equisetum*, *Pinus Virginiana*, *Juniperus*, *Carex* (285), *Hicoria* (398), *Fagus* (403), *Salix*, *Polygonum sagittatum* (426), *Ranunculus* (455), *Platanus* (475), *Crataegus*, *Impatiens* (545), *Viola*, *Liquidambar* (474), *Diospyros* (634), *Quercus Phellos* (474), *Prunus serotina* (492), *Cornus florida* (602), Liliaceae, native Cruciferae (462), Umbelliferae, Labiatae, Scrophulariaceae, spring flowers (453) and weeds. (Almost the same might be said of some of the pine-barrens of the southeastern states.) In the list of characteristic pine-barren plants on pages 77-78, 47 per cent. of the angiosperms are monocotyledons, and there are 11 species of Ericaceae and Vacciniaceae. Nine of the 13 Melanthaceae mentioned in the catalogue grow in the pine-barrens, and three of them are confined to that region and one nearly so.

On pages 81, 100 and 101 the author points out that the Middle district is not a mere "tension zone" between the pine-barrens and the Piedmont region, as was recently supposed, but has enough characters of its own to rank equally with the pine-barrens as a distinct geographical division. It includes all of

\* Ann. Rep. Fla. Geol. Surv. 3: 234, 237; Bull. Torrey Club 38: 231-232; Torreya 11: 233-234. 1911.

the Cretaceous and part of the Tertiary region of New Jersey, and is the northern analogue of the "Middle district" of South Carolina, as defined by geographers a century ago. Its soil being much richer than that of the pine-barrens, the area is now mostly under cultivation and pretty thickly settled, and natural vegetation is scarce (p. 82). The remaining forests are mostly deciduous, contrasting strongly with the evergreen pine-barrens. (See interesting notes on this point on pages 474 and 602.) Several isolated colonies of pine-barren (mostly bog) plants are known in this region (see p. 74, and several places in catalogue), and they are regarded, no doubt correctly, as relicts rather than as recent invasions, which is presumably true also of the numerous colonies of pioneer plants outside of the coastal plain in the states farther south. Only 22.4 per cent. of the angiosperms listed as characteristic of the middle district on pages 88-90 are monocotyledons; which is less than half the percentage for the typical pine-barren plants.

The short chapter on weeds (pp. 99-101) is very interesting. The author states there that such plants are comparatively rare and easily recognized in the pine-barren region, where they are chiefly confined to the vicinity of the older and larger settlements, where the native vegetation has been damaged or destroyed by civilization. Spontaneous encroachment of introduced plants upon ground occupied by natives is practically unknown. Several "native" species which behave like weeds in the pine-barrens are listed on page 100, but there seems to be absolutely no evidence that they are native in New Jersey or anywhere near there.

In the taxonomic catalogue, which makes up the greater part of the book, about 1,400 species of vascular plants are enumerated, and nearly half a page is given to each. It is not a regular descriptive flora, but keys to all the species are included (at the request of the Museum authorities, the author says on page 34), and these keys are not merely copied from other books, but show considerable originality. This work differs from nearly all other local floras of similar scope in excluding known introduced species from the catalogue proper—though many of them are mentioned

in the keys, for purposes of identification. This way of treating them corresponds with current ornithological usage, and is a decided improvement on the practice of most botanists. Since the author has gone ahead of his botanical predecessors to the extent of excluding species known to have been introduced from foreign countries, one can hardly criticize him for not going a step farther and excluding species which are commonly supposed—though sometimes on insufficient grounds—to be native in other parts of the northeastern United States, when there is no good evidence of their indigeneity in southern New Jersey. (Several examples are mentioned on page 100, and numerous others in the catalogue.\*) He does indeed state in many such cases that the species in question can hardly be native in the pine-barrens, and implies that they might be equally foreign to the other parts of his territory.

The author's ornithological training is revealed in his methods of citation. Wherever a species has been transferred from one genus to another the author of the new binomial is ignored, a practice more justifiable under the "Rochester" rules of two decades ago, which gave absolute priority to specific and varietal names, than under the rules of botanical nomenclature now in vogue, which allow some classes of exceptions. Like most zoologists and some botanists, he decapitalizes all specific names, regardless of origin, and uses Roman numerals for volume numbers. (In citing periodicals in footnotes the year is often substituted for the volume number, as was the custom for a number of years with the proceedings of the institution of which he is curator.) Each species listed is accompanied by a citation of its original description and type-locality (these data not merely copied from another book, but verified from the originals in nearly every case; see p. 34), and references to the pages of a few previous floras of the same region where it is mentioned. If it has been listed under different names in any of these other works those names are also given. Every accepted species is also given an English name (a fictitious one if no *bona-fide* one is known), in which particular the author is again following ornithological usage.

\* See also Bull. Torrey Club 35: 352-353. 1908.



The best feature of the catalogue is the way in which the distribution of each and every native species is summed up with reference to the whole state, and correlated with habitats as far as possible. The author here shows a wholesome disregard for the fetters of tradition, and although full credit is given to previous writers (see p. 26), many questionable statements about the occurrence of certain species in southern New Jersey (*e. g.*, *Lophotocarpus*, *Dichromena*, *Aletris aurea*, *Chondrophora*) that have been handed down for generations and accepted without much question are rejected for lack of evidence, and many alleged distinct species proposed in recent years are relegated to synonymy, though not without some explanation. In the case of several of the rarer or otherwise noteworthy species there are interesting annotations, sometimes extending over more than a page (about three pages for *Schizaea* and six for *Corema*),\* and often accompanied by references to biographical sketches of the persons who first found them in the state. The time of flowering is given in most cases, and finally the known localities in the region, always classified according to the five natural divisions.

On the whole, this catalogue gives all the information about the local distribution of the species that one could reasonably expect, and in that respect it is far ahead of most of the floras of states and smaller areas that have been published in recent years. It serves very nearly the same purpose for 1,400 northeastern plants that Mohr's Plant Life of Alabama does for 2,500 southeastern plants, and measures well up to the high standard for local floras suggested in a valuable unsigned editorial in the Botanical Gazette for May, 1896. The information about habitats is more satisfactory on the whole than that found in our manuals, which treat such matters altogether too lightly.

The whole treatise gives one the impression of being based on very thorough work, and leaving very little for future explorers

\* On page 634 the author notes a very interesting geographical triple correlation between the persimmon, the opossum and the negro (not the city-dwelling but the rural or agricultural negro, whose northern range is more restricted). One can hear rumors of such a correlation in some of the southern states, and the reviewer was told as long ago as 1905 by Dr. Hollick while on a trip to the southern part of Staten Island that it holds even there; but it perhaps has never been so definitely expressed in print before.

of that region to do in the way of defining local distribution. Although the author has shown a most commendable conservatism in refusing to include species whose occurrence or taxonomic status is doubtful, he does not seem to have overlooked any important source of information, or to have rejected any recently described species without reasons that seemed sufficient to him. Persons who contemplate doing floristic work on a similar scale elsewhere in the near future would do well to take Mr. Stone's work for a model, and not allow themselves to fall short of his ideals.

From the little statistical summary on page 806 one can easily gather an interesting fact that is not mentioned anywhere in the book; namely, 36.6 per cent. of the angiosperms catalogued are monocotyledons. This is the largest proportion of monocotyledons in any equal area of dry land in North America, as far as known to the reviewer,\* and indicates again the decided pioneer character of the vegetation of a large part of the area.

The bibliography contains 92 titles, with extended comments on some of the papers, and references to biographical sketches of some of the earlier authors. It is arranged chronologically or nearly so, and is probably nearly complete for the ground covered.

The index unfortunately is not up to the standard of the rest of the book, as it is almost confined to the accepted species in the taxonomic catalogue. Both technical and common names are included, but there is only one reference to each, synonyms seem to be ignored, and the species are not indexed separately except in a few of the larger genera. The names of botanists whose biographies are referred to in the same 666 pages, and some of the chapter headings in the first 100 pages, are also included. The bulk of the index would have been increased very little by including references to all the explorers of the region, especially those whose biographies are referred to in the bibliography; and perhaps not at all by including the plants mentioned in the introductory part. This, however, may be one of those too common cases where the index was prepared by some other person than the author.

\* See *Torrey* 5: 207-210. 1905.

Last, but not least are the 129 half-tone plates, representing over 350 species of plants. The book contains no list of these illustrations, but they may be classified approximately as follows: Photographs of vegetation, 3 per cent. (one of them is out of plumb; a very common but well-nigh inexcusable fault of half-tone cuts\*); photographs of single plants in their native haunts (mostly by Bayard Long), 8 per cent.; photographs of whole plants removed from their natural surroundings (mostly by Stewardson Brown), 12 per cent.; photographs of fragments of plants (mostly pressed inflorescences of grasses, sedges and rushes), 34 per cent.; photographs of paintings of single plants by H. E. Stone, 31 per cent.; line-drawings of single plants (also by H. E. Stone), 12 per cent. The last three classes add little to existing knowledge, but they are useful for purposes of identification, like the keys, and they doubtless include some species which had not been figured before (outside of the small line-drawings in Britton & Brown's *Illustrated Flora*).

The book contains many other valuable features, which can hardly be mentioned in the brief space of a review. With such a splendid floristic foundation to build on, the time is now ripe for some ecologically-inclined botanist to make a detailed study of the vegetation of the same region, and thereby fill a long-felt want and perhaps win laurels for himself. It seems strange that more work like this of Stone's has not been done, especially in those parts of the country where botanists are most numerous and where some of them have ample leisure and resources.

ROLAND M. HARPER

## PROCEEDINGS OF THE CLUB

MAY 29, 1912

The meeting of May 29, 1912, was held in the laboratory of the New York Botanical Garden at 3:30 P.M., Vice-president Barnhart presiding. Twelve persons were present.

The minutes of April 24 and May 14 were read and approved.

\* See *Science* II: 35: 985. 1912.